

Banyai discloses a process for agglomerating a concentrated ore material using a binder comprising alkali metal salts of carboxymethyl cellulose (CMC) or carboxymethyl hydroxyethyl cellulose and sodium tripolyphosphate. Banyai briefly mentions that other substances such as polysaccharides or sodium citrate may also be contained in the binder.

In contrast, claim 1 of the present invention is directed to a process of commingling metallic ore with a moistening effective amount of water, a binding effective amount of guar, guar derivatives or a mixture thereof, and a binding effective amount of a weak acid. As conceded in the Office Action, Banyai does not disclose such a process. Instead, it is hypothesized in the Office Action that metal ions in the water would combine with the acid to form a salt such that the recitation of adding the components of claim 1 is tantamount to reciting that a salt of the weak acid is added and the use of such salt would be obvious in view of Banyai.

Applicants first note that although an Examiner may rely on logic and scientific principles in support of a reject ion under §103 some evidentiary basis must be presented for the existence and meaning of the logic or scientific principle relied upon. The mere statement in the Office Action that "it reasonably appears that metal ions in the water will combine with the acid to form a salt" is not sufficient to support a *prima facie* case of obviousness.

Further, as discussed in more detail below, Banyai does not teach, suggest or disclose a binder composition comprising both a salt of a weak acid and guar, guar derivatives, or a mixture thereof, as described in the claimed invention. Assuming, in *arguendo*, that Banyai does teach such a combination, it would still not be obvious to one skilled in the art to combine guar and a weak acid as claimed in claim 1.

If one skilled in the art were to use the same reasoning set forth in the Office Action, he/she would expect that it would not matter whether sodium citrate or citric acid was used since, in both cases, he/she would obtain pellets with similar pellet properties.

This, however, is untrue. In fact, when acids are utilized in the process of the present invention, better synergy and pellet strengths result than when salt is used. It is believed that this is because of the lower pH that results when an acid, not a salt, is combined in the binder. Specifically, the low pH of the pelletizing system modifies the way in which the polymer is adsorbed onto the ore surface. Compare, for instance, the wet and dry strengths shown in example 3 (guar –citric acid combination) to examples 46 and 47 (guar-sodium citrate) of the present application. Thus, the addition of a weak acid cannot be considered tantamount to adding the salt of a weak acid.

Additionally, because of the lower pH, the use of acids in the pelletizing system provides a definite advantage in iron or steel making processes because of the resulting lower alkali contribution. Sodium or other alkali materials cause steel to become raw and brittle and shortens the life of the refractories in the blast furnaces and are not desirable.

Claims 3, 4, 7, 8, 41 and 47 are dependent upon claim 1. As such, they are patentable over Banyai for the reasons discussed above.

In the Office Action, claims 1, 3, 4, 7, 8, 41 and 47 are also rejected under 35 U.S.C §103(a) as being unpatentable over Banyai alone or in view of U.S. Patent No. 4,597,797 to Rooda et al (hereinafter "Rooda"). Claims 1, 3, 7, 8, 41 and 47 are further rejected under 35 U.S.C §103(a) as being unpatentable over Banyai alone or in view of Rooda, and further in view of U.S. Patent No. 3,591,543 to Stafford (hereinafter "Stafford"). Applicants note that the reasoning for the latter rejection has been cut off mid-sentence in the Office Action, but will address this rejection to the extent possible. Both rejections are hereby respectfully traversed.

Rooda only adds a salt of tartaric acid to the teachings of Banyai. Rooda does not disclose the use of a weak acid. Thus, for the same reasons as set forth above for Banyai alone, the combination of Rooda and Banyai also do not teach, suggest or disclose claim 1 or any of the claims dependent thereon.

Stafford is cited as demonstrating that a skilled person would recognize that the salt of a weak acid can be prepared in situ. However, there is no reason to combine the teachings of Stafford and Banyai as Stafford is directed to methods of gelling polyvinyl alcohol and Banyai is directed to a method of pelletizing ores. There are distinct differences between gelling polyvinyl alcohol and pelletizing ores and one skilled in the art would not be motivated to combine these teachings. Obviousness of a claimed invention has to appear from a direction in the references, not from teachings of the disparate references involved here.

Further, even if such a combination of references was proper, which it is not, the combination still would not teach, suggest or disclose the present invention. Specifically, Stafford discloses that adding a water soluble organic acid of 1-6 carbon atoms and a water soluble alkali metal hydroxide, a salt may be prepared in situ. Stafford does not teach, suggest or disclose a mechanism one skilled in the art could utilize to determine that the mere addition of a weak acid to a combination of metallic ore and a moistening effective amount of water would result in the in situ formation of the salt of a weak acid to an extent tantamount to adding the salt. Thus, the combination of Banyai, Rooda, and Stafford would still not teach, suggest or disclose the present invention as described in claim 1 and its dependent claims.

In the Office Action, claims 17, 19, 20, 21 and 43 are rejected under 35 U.S.C §103(a) as being unpatentable over Banyai. This rejection is respectfully traversed.

Banyai discloses a binder composition comprising (1) a water soluble polymer selected from the group consisting of alkali metal salts of CMC or carboxymethyl hydroxyethyl cellulose and (2) sodium tripolyphosphate, and a process for agglomerating a concentrated ore material using such a binder. More specifically, Banyai disclosed that the performance of alkali metal salts of CMC and salts of carboxymethyl hydroxyethyl cellulose in binder compositions are enhanced by the inclusion of sodium tripolyphosphate in the binder composition (see col. 2, lines 33-40).

Banyai states that the binder composition may also contain other substances, i.e. substances in addition to the alkali metal salts and sodium tripolyphosphate that form the basis of Banyai's invention. The list of "other substances" that could also be contained in the binder includes polysaccharides such as guar and inorganic salts such as sodium citrate. However, there is no teaching, suggestion, or even discussion, as to why the "other substances" are present. Indeed, the "other substances" are said to include "substances that are formed as by-products in the preparation of the alkali metal salt of CMC" (see col. 3, lines 61-65) which are likely not even intently added to the composition, but are present as a result of earlier processing.

It is well known that the reference must expressly or impliedly suggest the claimed invention. Ex parte Clapp, 27 USPQ 972 (Bd. Pat. App. & Int. 1985). Even if the prior art could be modified to result in the present invention, that fact alone would not make the modification obvious unless the prior art itself suggested the desirability of the modification. In re Gordon, 733 F.2nd. 900, 221 U.S.P.Q. 1125 (Fed. Cir. 1984). In the present case, no line of reasoning has been presented as to why one skilled in the art would have found the claimed invention obvious in light of the teachings of the reference. A listing of additional components that may or may not be present in the binder composition of Banyai, when there is no teaching or suggestion as to why it is desirable to have the binder contain any of such "other substances", would not motivate one skilled in the art to make a binder composition comprising the combination of guar and a salt of a weak acid, as described in the present invention. At most, one skilled in the art might find it obvious to try the combination of the present invention in light of Banyai, but whether a particular combination is "obvious to try" is not a legitimate test of patentability. In re Fine, 837 F.2d. 1071, 5 USPQ 2nd 1596 (Fed. Cir. 1988).

Neither guar or sodium citrate function well as a binder on their own, but superior results are achieved when both are used in combination as disclosed in the present invention. Guar functions to control water during pelletization, and for optimal effectiveness, it is better if guar does not adsorb onto the ore surface, but instead stays in the water regions separating the iron ore grains inside the pellet. However, if used on

its own in a binder, guar will bind easily onto the ore surface and lose functionality. It was unexpectedly found that when used in combination with sodium citrate, the citrate is adsorbed onto the ore and serves to block the adsorption of guar thereby making the guar more effective.

Claims 19, 20, 21 and 43 are dependent claims to claim 17. As such, they are patentable over Banyai for the reasons discussed above.

In summary, the present invention is both novel and non-obvious in view of the references cited in the Office Action. The Applicants respectfully request that the Examiner reconsider the rejection and find the claims in condition for immediate allowance.

In accordance with Section 714.01 of the M.P.E.P., the following information is presented in the event that the Examiner deems a call desirable:

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